

Unit 1: Introduction to Polynomial Functions

Activity 6: Applications of polynomial functions



Solutions

Answers:

1. For what values of k does the function $f(x) = x^3 + 6x^2 + kx - 4$ give the same remainder when divided by $(x-1)$ and $(x+2)$?

Answer: $k = 3$

Method: Divide $f(x)$ by each of the binomial divisors in turn, and find the remainder as an expression of k . Then equate the two expressions to find the value of k . Use either long division or synthetic division, as you wish, but show your work clearly.

2. A rectangular shipping container that the Food Bank uses to store their tinned food, has a volume of 2500 cm^3 . The container is 4 times as wide as it is deep, and 5cm taller than it is wide. What are the dimensions of the container?

Answer: 25 cm X 20 cm X 5 cm

Method: Let x be the depth of the box. Therefore, $4x$ is the width of the box and the height of the box is $4x+5$.

$$\text{Volume} = (x).(4x).(4x+5)$$

Expand to find the function, and then solve the corresponding equation to find the answer.

3. Use the Factor Theorem to prove $x^3 - 13x - 12$ is divisible by $x^2 - x - 12$

Answer: both of the polynomials are divisible by $(x-4)$ and $(x+3)$ which are the factors of $x^2 - x - 12$

4. Determine the value of k when $x^3 + kx^2 + 2x - 3$ is divided by $x + 2$, and the remainder is 1.

Answer: $k = -4$

Method: Divide the given polynomial by $x+2$ and find the remainder as an expression in k . Then equate the remainder expression to 1 and solve for k .

5. A rectangular shipping container has a volume of 1009 cm^3 . If the piece of rectangular cardboard that the container is made from has dimensions 30 cm by 20 cm, what are the dimensions of the container? Remember, you will be cutting squares out the of corners of the cardboard material to create the container.

Dimensions: 24cm X 14 cm X 3 cm

or

Dimensions: 20.2 cm X 10.2 cm X 4.9 cm

Method: Solve this problem in the same manner as **Example 2** in the Content section.